Paper/Work

LLNL Postdoc Association Newsletter
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Lightning Strikes! Postdocs Tell Stories in a Hurry at the First Lightning Talks Event

By Charles Reid

You're at a conference, and it's the end of the day. You're taking the elevator back to your room, when someone says, "Hold the door!" Onto the elevator steps... the vice president of one of the most important firms in your field. You know they probably don't have a technical background, but you've just been handed a golden opportunity and you have 10 floors to take advantage of it.

You're at a Christmas party, investigating the cookies, when your twelve-year-old nephew decides to investigate your work. He asks what you do. You say, "I'm a scientist." And he responds, "Yeah, sure, but what do you actually DO?"

Given that we may spend most of our waking life around groups of physicists, biologists, or engineers whose combined length of schooling would date back to the Mayflower or earlier, it's easy to forget that the rest of the world doesn't really know why we do what we do: why inertial confinement fusion is the key to understanding the formation of the universe, why a thirty-second PCA in a suitcase can turn the tables on infectious disease, why underground coal gasification can tap previously inaccessible energy sources in the U.S. to produce gasoline without oil.

Lightning Talks are an attempt to replicate a presentation format frequently encountered outside of the Lab: condensing complex technical ideas into a five-minute "sound byte" that a non-scientist can understand.

But Lightning Talks aren't just for communicating ideas to a venture capitalist or a family member: it is important for research scientists, who are largely dependent on taxpayer dollars spent by funding committees steered by non-scientists, to learn effective communication skills. More important than that, we are living in a vastly complex and uncertain world, where science is marginalized and pseudoscience has become increasingly attractive (according to a Gallup poll, more than 50% of Americans are not convinced of the factuality of the theory of evolution). This enormous gap in knowledge—call it the broken elevator in the ivory tower—should be our biggest concern as scientists.

But there's a fun side to Lightning Talks, too: storytelling. By and large, scientists (like anyone else) would rather learn about a concept through a story than

Lightning Strikes, continued

through a technical seminar targeted at experts-only. The most successful keynotes and conference presentations are the ones that tell a story, the ones where you feel the tension, where you desperately want to know what happens next, where you find yourself hoping for a stroke of luck or a eureka moment. Because a scientist's job isn't to just to say, I did this, then I did this, and I analyzed it this way, thanks for listening, now are there any questions. You want your work, and science as a whole, to matter. And if you can't tell a story, you'll have a hard time making your case, no matter how impressive your science may be.

The first lightning talk, entitled "What the Frack is Fracking?," covered fracking, a technique for extracting natural gas locked up in rocks with low permeability by fracturing the rocks with high-pressure water. The presentation covered important background information like how fossil fuels were formed, through an explanation of the economics driving natural gas exploration and how important natural gas is, and a description of fracking itself. Fracking is a controversial topic, and as with any controversial topic, people are eager to distort facts. "Just the facts, ma'am," would have been a good theme to describe the first lightning talk.

The second lightning talk was an impromptu explanation of how to make pizza for large groups. This included a cost-benefit analysis of ingredient-buying, cooking techniques, potential pitfalls that could lead to a ruined pizza, and some "chef's secrets" on how to keep the pizza from sticking to the peel—the long-handled spade you use to insert and remove the pizza from an oven. Here's to hoping that the next lightning talk will include a hands-on cooking demonstration.

The next Lightning Talk event is tentatively scheduled for late April. Look for an email announcement in the coming weeks, and consider putting your five-minute skills to the test!

Winner of the 2012 LLNL Postdoc T-Shirt Contest

Congratulations to Ya Ju Fan for coming up with the winning "Energy, Science, and Technology" design! A total of 99 T-shirt orders have been collected and the T-shirts will be distributed soon, probably in 3-4 weeks. Thanks to all who participated by submitting designs and voting!

Next Steps: Interviews with Former Postdocs

When was the end of your postdoc?
Félicie Albert: February 2010.

Where do you work now and how is that similar or different from what you did as a Post-Doc?
Well, I am still here, right where I started, in the NIF and Photon Science directorate. My job is very similar actually. I am an experimental laser-plasma interaction physicist, so I design, perform and analyze experiments using lasers, with a little bit of theory sometimes. The only difference is that now I am more comfortable in my environment, whereas as a postdoc, I did not know the Lab that well.

Did you apply elsewhere? Why did you make this particular choice (Lab vs. academia vs. industry)?
Yes, I applied for research positions in France, where I am from. Although I do not have too much experience working in industry, I think that there are aspects that I like about academia and industry, and that the Lab seems to have the best of both worlds. In industry, you sometimes have deadlines, "healthy" pressure and a sense of mission that allow you to keep a certain dynamism. I found that also at the Lab but not at universities where I worked. And if you are really motivated for it and have something good to offer, the Lab will support you to try to find your own funding, like at a university.

On top of working on exciting scientific projects with good people, what made me chose the Lab is also the comfortable lifestyle that it allows me to maintain. I find it very easy to balance my professional and personal life with my job at the Lab.

What did you enjoy the most and the least about being a postdoc at LLNL? What do you think are the differences between a postdoc at the Lab versus at a university?
That's a tough question! I think what I enjoyed the most is that I felt welcomed like a professional right away by the people I work with. They treated me as their equal, their colleague, and maybe that is not always the case in a university. Something I really enjoyed is that here, you can pretty much find every kind of scientific and technical expertise that you want. I had people teach me how to use a germanium detector, write codes for Compton scattering, align lasers, run Monte Carlo simulations, write better papers, write proposals, and many other things. The fact that you have all these skills "at home" is really helpful, whereas at a University you may have to contact some distant group that you don't know to get what you want. Now for what I liked the least: I would say dealing with all the foreign national-related paperwork and procedures. I know it is part of

the game, but I could not (and still can't) help being frustrated when I miss a good seminar because I don't have the authorization to enter the building where it's held or when I have to have people meet me at the cafeteria for an important meeting instead of me going to their offices.

How far along your postdoc were you when you decided what the next step in your career would be?
I was not entirely sure that I was going to stay at the Lab when I started my postdoc. Initially, my plan was to do a 2-year postdoc and then go back to France to get a permanent research position there. But along the way, I found the Lab to be a workplace that really suits my personality and my style in many aspects. Since you are roughly spending 1/3 of your time at work, you should be doing something that you like, and in an environment that you like. It was really at the end of my postdoc that I made the decision to stay here. I really have a good picture of what my career could be at the Lab, and I like it: I think that I still have a lot to learn to become a better scientist, and maybe later I'd like move into a position where there is more management involved. In any case I think that this place can really help you to find your own path, and that you have a lot of options.

On a more personal note, as postdocs we are usually in our late 20s or early 30s, a time that is a turning point in our lives for most of us. This means that

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there is always a "multiple body problem" when you make decisions about your career. The fact that both my husband and myself have found jobs where we can feel accomplished was really an important aspect of my decision to stay at the Lab. And let's be honest here: the fact that I really enjoy the Bay Area (actually more than Paris!) was also an important factor.

How did you get your new job?

It was a really smooth transition. About 1.5 years into my postdoc, I told my management that I was starting to look at permanent positions elsewhere and that I also wanted to consider staying at the Lab. They put together a job description, and right after two years of postdoc, I got a call from HR making me an offer to be a flex-term. I think the lab is extremely supportive to convert its postdocs as full staff, and it really makes sense, because after two years we are more aware about the Lab's work style and projects than someone applying from outside. So if you really do well during your postdoc and if show that you have a strong desire to stay, you're on the right track.

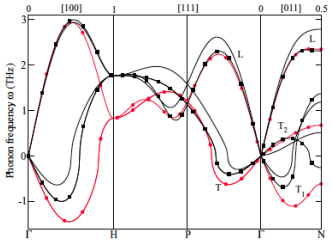
Any piece of advice for postdocs at LLNL?

If I only had one, I would say: PUBLISH. Do it as much as you can, and work on projects where you can publish. I know that sometimes you can be asked to do more programmatic work, but no matter what you will do after your postdoc (stay at the Lab, university or industry), it will always serve you to have a good publication record. Publishing is the only way to keep doors open everywhere, and this is important, especially if you don't know what the next step will be. Otherwise, while you are a postdoc, you have 25 % of your time that you can use as you like: use it wisely to work on different projects and broaden your connections within the Lab. Go and see what is happening in other directorates and groups at the Lab. Personally, I used this 25 % to join two projects that involved experiments at the Lab's Jupiter Laser Facility and Stanford's LCLS: I learned a lot, made new connections and got more publications. If you want to keep doing research, you should also try to write proposals. It forces you to sit and think about your ideas and articulate them properly, and since you will probably have to do that when you are more advanced into your career, the earlier you start, the better.

—Interview conducted by David Alessi

Postdoc-Related Highlights from Notes to the Director

Predicting high-temperature structure and properties of correlated-electron metals



Density-functional theory (DFT) is a very successful method for predicting the thermodynamically stable phases of metals at low temperatures. Except for metals with strong electron-correlation effects, such as the lanthanides and heavy actinides, DFT has been used for low-temperature, condensed-matter applications across the periodic table. Until now, it has been difficult or impossible to model high-temperature phases with accuracy comparable to that possible at room temperatures or lower because of the difficulty of simultaneously treating electronic and vibrational interactions within a quantum-mechanical framework. Use of DFT becomes problematic when the high-temperature phase is mechanically unstable at low temperatures, making it impossible to use perturbation methods for approximating the effect of higher temperature on structure. An additional pitfall when studying f-electron systems such as the actinide or rare-earth metals is the possibility of a dramatic change in the f-electron behavior with temperature. In a paper published in the Feb 29 issue of *Physical Review B*, Per Söderlind, **Blazej Grabowski** (LLNL postdoc), Lin Yang, Alex Landa, and colleagues from Aalto University (Finland) and Uppsala University (Sweden) show that use of the recently developed self-consistent, *ab-initio* lattice dynamics (SCAILD) method, in conjunction with highly accurate and fully relativistic density functional theory, overcomes these problems. Using this method, they show it is possible to predict the high-temperature (> 1000K) stable structure, phonon dispersion, and the density of states for uranium, a prototypical actinide, that compare well with experimental data. This result establishes that high-temperature lattice dynamics can be modeled from *ab-initio* theory, even for complex materials with significant electron correlations such as the actinides. "High-temperature phonon stabilization of γ-uranium from relativistic first-principles theory," Phys. Rev. B **85**, 060301 (2012) http://prb.aps.org/abstract/PRB/v85/i6/e060301

Professional & Career Development

Advanced Presentations by Design. Instead of starting a new talk by making slides in PowerPoint, just use low-tech, easily rearranged sticky notes and focus on telling a story. Lead the audience by presenting a "complication" (unresolved problem) for each new piece of information that is introduced. It's similar to how movies are "storyboarded." This improves quality and saves time by reducing the number of slides that one makes but never get used.

I found this and other tips to be quite helpful for a new talk that I wrote. The systematic structure laid out by this book does seem to make good talks less of an accident and more of a likely outcome.

—Nathan Kugland

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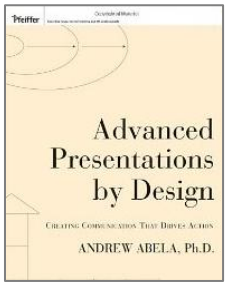

Upcoming Events

Postdoc Dinner & a Movie Night!
Wednesday April 11, 2012, time TBD but around 7 PM
Enjoy pizza and/or hot dogs and watch Dr. Strangelove

In Other News…

Funny and oh-so true! http://sotak.info/sci.jpg

Postdoc Lunch at Sai's Vietnamese Restaurant

A total of eight youngsters from the lab (Jennifer Ellsworth, Ian Ellis, Andrii Chyzh, Ana Benedicto Cordoba, Sheldon Wu, Nicholas Be, and Paul Martinez, from left to right, and Andre Schleife) went out together for a tasty Vietnamese lunch on Friday, March 23rd. You missed out on what Sai's restaurant served this time? Don't worry, our monthly series of culinary expeditions will continue in April. Stay tuned!
—Andre Schleife

Selected Recent Research Publications by LLNL Postdocs

Bold = LLNL Postdoc. *Broadcast your achievements! Make new connections & help show how we are doing collectively.*
Guidelines: 1) Peer-reviewed publications only, nothing in progress; 2) Your affiliation must be LLNL; 3) Prepare a standard-format citation with all authors (no *et al*), the full title, and journal/proceedings info; 4) Note which authors are LLNL postdocs, and in what division & group; 5) Send all of this to Nathan (kugland1@llnl.gov).

Computation/CASC: **Kathryn Mohror** and Karen L. Karavanic, "Trace Profiling: Scalable Event Tracing on High-End Parallel Systems," Parallel Computing, 38(4-5):194-225, April-May 2012.

PLS/AEED/Experimental and Applied Geophysics Group: **Du Frane W. L.**, Tyburczy J. A. (2012), "Deuterium-hydrogen exchange in olivine: Implications for point defects and electrical conductivity," Geochemistry Geophysics Geosystems, 13(3), doi: 10.1029/2011GC003895.

PLS/AEED and CSD**:* **Harris E. Mason***, **Stephen J. Harley****, Robert S. Maxwell, Susan A. Carroll, "Probing the surface structure of divalent transition metals using surface specific solid-state NMR spectroscopy," Environmental Science and Technology 46, 2806-2812 (2012)

PLS/AEED/Program for Climate Model Diagnosis and Intercomparison: **Zhao, C**., S. A. Klein, S. Xie, X. Liu, J. S. Boyle, and Y. Zhang (2012), Aerosol First Indirect effects on non-precipitating low-level liquid cloud properties as simulated by CAM5 at ARM sites, Geophys. Res. Lett., doi:10.1029/2012GL051213, in press.

PLS/CMMD: **A. Stukowski** and A. Arsenlis, "On the elastic–plastic decomposition of crystal deformation at the atomic scale," Modeling Simul. Mater. Sci. Eng. 20 035012 (2012)

PLS/CMMD/Quantum Simulation Group: Luiz Cláudio de Carvalho, **André Schleife**, Jürgen Furthmüller, and Friedhelm Bechstedt, "Distribution of cations in wurtzitic InxGa1-xN and InxAl1-xN alloys: Consequences for energetics and quasiparticle electronic structures," Physical Review B 85, 115121 (2012)

PLS/CSD/Experimental Nuclear and Radiochemistry Group: **Tereshatov E.E.**, Gostic J.M., Henderson R.A., Shaughnessy D.A., and Moody K.J., "Procedures for Db chemical characterization in off-line experiments," Journal of Radioanalytical and Nuclear Chemistry, (DOI) 10.1007/s10967-012-1737-7 (March 2012).

PLS: **C. Bellei**, M. E. Foord, T. Bartal, M. H. Key, H. S. McLean, P. K. Patel, R. B. Stephens, and F. N. Beg, "Electron and ion dynamics during the expansion of a laser-heated plasma under vacuum" Phys. Plasmas 19, 033109 (2012); http://dx.doi.org/10.1063/1.3696003

Comments/Suggestions/Praise/Complaints? Your Participation is Welcome!

Please send your comments or questions to the Editor (Nathan Kugland, kugland1@llnl.gov).

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